
Original Article

Preserving the cultural identity of Chinese cities in urban design through a typomorphological approach

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Abstract This paper analyses the historical process of transformation of the urban blocks, plots and building fabrics in Suzhou, China from the tenth century to the present day using a typomorphological approach, and offers some design suggestions for urban designers and policy-makers based on the examination of the local context. The study aims to propose the western typomorphological concept in Chinese urban design, to maintain local cultural identity in an era of rapid globalisation. The study reveals that typomorphology is an effective tool to solve the current problems in urban developments, and should be adopted in both the urban analysis and urban design of Chinese cities.

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Introduction

Over the past three decades, Chinese cities have been experiencing rapid urbanisation and modernisation on an enormous scale, which has caused various urban problems and has drawn attention from scholars in multiple disciplines worldwide. A vital problem is that Chinese cities are becoming ‘placeless’ – congested with ‘international-style’ architecture and characterless urban spaces. The remarkably long, rich and complex Chinese cultural history is gradually excluded from its architectural representation. The current architectural language does not express local social relations, collective memory and aesthetic achievements. Therefore, the identity of Chinese cities is facing a great challenge of survival in rapid development. It is important to maintain unique Chinese characteristics of urban forms in order to facilitate cultural expression, inhabitants’ sense of place, harmonious physical environment and tourism. Moreover, there is a large amount of historical remains fragmentally distributed in contemporary Chinese cities. Therefore, it is vital to match the new with the old

in order to create coherent city entities and legible city images.

This paper applies ideas from western typology and morphology theories to the Chinese context to generate an appropriate methodology for the analysis of Chinese cities, and, accordingly, to further provide design suggestions for urban designers and policy-makers to produce culturally sustainable urban forms. The Chinese city Suzhou is selected as a case study for the above purposes due to its splendid tradition and presence of strong historical urban fabric.

The identity of a place, which is closely linked to the personal and social identity of inhabitants, is recorded and embodied in the traditional built forms, and reflects the choices of specific culture (Watson and Bentley, 2007). Therefore, social and cultural value can be revealed through the examination of long-lasting traditional urban artefacts and their transformation over time. Some commonly studied urban elements that are considered to be important and constitute an urban form in the literature are streets (see, for example, McCluskey, 1979; Jacobs, 1993; Dumbaugh and Gattis, 2005; Marshall, 2005),



public squares (see, for example, Sitte, 1965; Hegemann and Peets, 1988; Whyte, 1988; Gehl, 2001; Carmona *et al.*, 2003), urban blocks (see, for example, Paneral *et al.*, 2004), skylines (see, for example, Attoe, 1981; Kostof, 1991; Stamps III *et al.*, 2005) and landmarks (see, for example, Lynch, 1960). This paper focuses on urban blocks, including plots and building-grouping patterns, as some of the fundamental elements of urban form.

The analysis of urban blocks and related design suggestions can help designers and policy-makers understand the historical transformation of urban forms, and can assist them in creating new urban forms appropriate to their context. Furthermore, the paper discusses the merits of typomorphological approach in the Chinese context, and discusses how it can be implemented by designers and policy-makers in other Chinese cities, to achieve design which is harmonious with the local built environments and enhances their identities.

Typomorphology

'Type', 'synchronic type' and 'typological process' are three fundamental terms in the examination of urban blocks of Suzhou. The concept of type, and by extension typology, has been advocated by rationalists in their scholarly and design works over almost two hundred years since the first definition of 'type' was proposed by Quatremere de Quincy (1825) through the comparison between type and model. A 'type' is the origin, essence, characteristics and structural principle of forms, which cannot be exactly copied as a model. It provides a design framework for designers, within which flexibility of detailed designs is allowed.

A group of architects in Italy called the Italian Typological School have further developed the theory in architectural and urban design since the 1950s. The School's founders Muratori (1950s) and Caniggia (1970s) have built a complete design theory, called 'operational typology', which has since been followed by many others such as Cataldi (1995). The School believes that there is a connection between the traditional and the new based on the fact that urban planning and design are deeply rooted in history. According to them, a 'type' is an *a priori* synthesis in the builder's minds before the actual building has been built. A 'synchronic type' emerges in certain periods of time in history, and may or may not be applied to other forms in later

periods. A 'typological process' is the progressive transformation of a series of related synchronic types on a particular scale in the same cultural context over time (Caniggia and Maffei, 2001, p. 54), and outlines the continuity and interrelation between types. Types not only exist in buildings, but also in urban forms at different levels of resolution, which are, in Italian Typology, 'building materials', 'buildings organism', 'urban tissue', 'urban organism' and 'territorial organism' (Caniggia and Maffei, 2001). The different levels of resolution of urban forms become the rationale for the subdivision of urban blocks in this paper.

From the 1960s to the present, urban morphology has been developed by geographers based on morphogenetic research in central Europe (Hofmeister, 2004), among these Germany-born Conzen (1969) was the founder of the British Morphological School. Together with his followers, he has created a conceptual rather than descriptive framework for the transformation of urban forms, (Whitehand, 2001, 2007). The framework divides a townscape into three research objects: the 'town plan', 'building form' and 'land use'. Furthermore, another fundamental concept of 'morphological region' indicates the structural relationship between different parts of a city, which contain different types of plan units, building forms and land use patterns (Conzen, 1969, 1981, 1988).

Within the school of urban morphology, Kropf (1993) started to integrate morphology theory with typology theory by searching for the intellectual similarities and differences between the two. Despite a definition of 'typomorphology' is still absent, it has already been suggested as a combination of typology and morphology theories in many scholars' studies, such as Castex and Panerai (1982), Moudon (1994), Hwang (1994), Samuels (2008) and Chen (2008).

Case Study-Suzhou

Introduction

Suzhou is located in the south alluvial plain of Yangtze River, southeast of Jiangsu Province, East-Central China, with 1650 square kilometers of urban land area. The southwest of the city is connected to Tai Lake, the surrounding area of which was once the most fertile land in history. There are numerous streams throughout the region, and the most developed Chinese city,

Shanghai, sits to its east. Suzhou has been lauded for centuries by the Chinese and foreigners as 'a true, revelatory symbol of Chinese society and culture', and for its material transformation that illustrates the social, intellectual and cultural relations typical of the traditional and modern civilization of China (Carroll, 2006, p. 7).

The development of Suzhou is divided into three periods according to the most dramatic changes of the city forms throughout its history. The city was founded as the capital of the state of Wu in 514 BC, while it flourished during the Northern Song Dynasty (960–1126 AD), when the city was initially commercialised and its basic morphological configuration was established. Since the late Qing Dynasty (1850s) and the Republic of China era (1911–1948), the city has been experiencing modernisation and absorbing external influences. During the People's Republic of China era (1949–present), Suzhou's urban form has changed dramatically because of nationwide industrialisation, urbanisation and globalisation. This examination concentrates on the old city region, which is inside the city moats, as it has the longest history and has experienced the most striking changes.

Based on the hierarchical method of subdividing urban forms, urban blocks consist of plots, which further consist of buildings. The synchronic types of blocks, plots and building fabric that carry the characteristics of each period and the possible typological processes of these types are illustrated below. Particular synchronic types are defined by size, height, location, proportion, density, volume of physical forms and their relationship with the surrounding environment, such as orientation and connection with access routes. These are based on the statistic data analysis of a number of blocks by the authors in particular morphological regions in each period. Moreover, some representative blocks are further selected by the authors to identify plot patterns and spatial relationships of buildings with their surroundings in detail. The empirical study of the urban blocks, plots and building-grouping patterns in Suzhou gives a glimpse of the scope of typomorphological analysis and the urban design of the city.

Suzhou's urban blocks in the first stage of urban development (960–1850s)

Traditional urban blocks in large Chinese cities were fundamentally influenced by two policies of

feudal governments, namely, the zoning concept and the LiFang system. The concept of zoning was meant to separate the noble class, humble class and different kinds of handicrafts industries, as determined by the feudal social hierarchy. The LiFang system was a system of social ordering employed by the government, and one LiFang was physically identical to an urban block. An urban area within a city was divided into a number of LiFangs or rectangular or square blocks, consisting of 25 south-north-oriented family courtyard houses (Zhong, 1986, p. 218). LiFangs were walled and had four gates each side, and were strictly controlled by government officers during the night until the Song Dynasty. Even though walls of LiFangs had been broken down and the numbers of households in one LiFang later became more diverse, its impact on the morphology of traditional urban blocks and plots remained, and Suzhou retains many traces of this.

The earliest study resource of urban blocks in Suzhou is a map dated from the Emperor Qian Long's reign (1736–1795). The completely built-up urban blocks were prevalent in the north and west parts of the city, whereas the previous Inner City and the southern part of the city were undeveloped by this period (Figure 1). There were three types of urban blocks in Suzhou in this period. The first one was the special block type (T1), wherein one block contained one grand building complex only. Another block type was the post-LiFang block type (T2), wherein blocks usually contained houses. The third type was the ordinary block type (T3), wherein blocks were mix-use. There were 12 T1 blocks in the city, which were between 200 and 300 meters wide and 250 and 300 meters deep, which made them larger than nearby blocks. T1s were walled, north-south-oriented and not fully occupied by buildings. T2 blocks were situated in the northeast and northwest parts of the city, and were rectangular. Blocks in the centre belonged to T3, most of which were for commercial use and smaller than T2 blocks. In addition, most of the blocks on the fringe belt of the city were irregular and arranged along the major streets.

Study areas A1 and A2 are the representatives of urban blocks in the first stage. The blocks in the east half of A1 (block 41 to 76) and the blocks in A2 are of T2 type, whereas the blocks in the west half of A1 (block 1 to 40) are of T3 type (Figure 2). Study area B represents the urban blocks in the second period, and was almost undeveloped in



Figure 1: Urban blocks of Suzhou in the eighteenth century and the selected study areas A1, A2 and B; Buildings in the blocks of T1 are marked as grey rectangles (Adapted by the author according to the official map of Qian Long's reign (Chen, 2006, p. 48)).

the first stage. The plot patterns in each block of A1 are shown in Figure 2. The sizes, portions and areas of the blocks of A1 have been measured and analysed to find common physical properties of T2 and T3. As shown in the four charts of Figure 2, the lengths of all blocks are similar,

between 50 and 100 meters, whilst the widths of the blocks vary between 50 and 250 meters, suggesting that the lengths of traditional blocks in Suzhou (north-south direction) are less flexible than their widths. The reason is related to the courtyard building type of this stage, as will

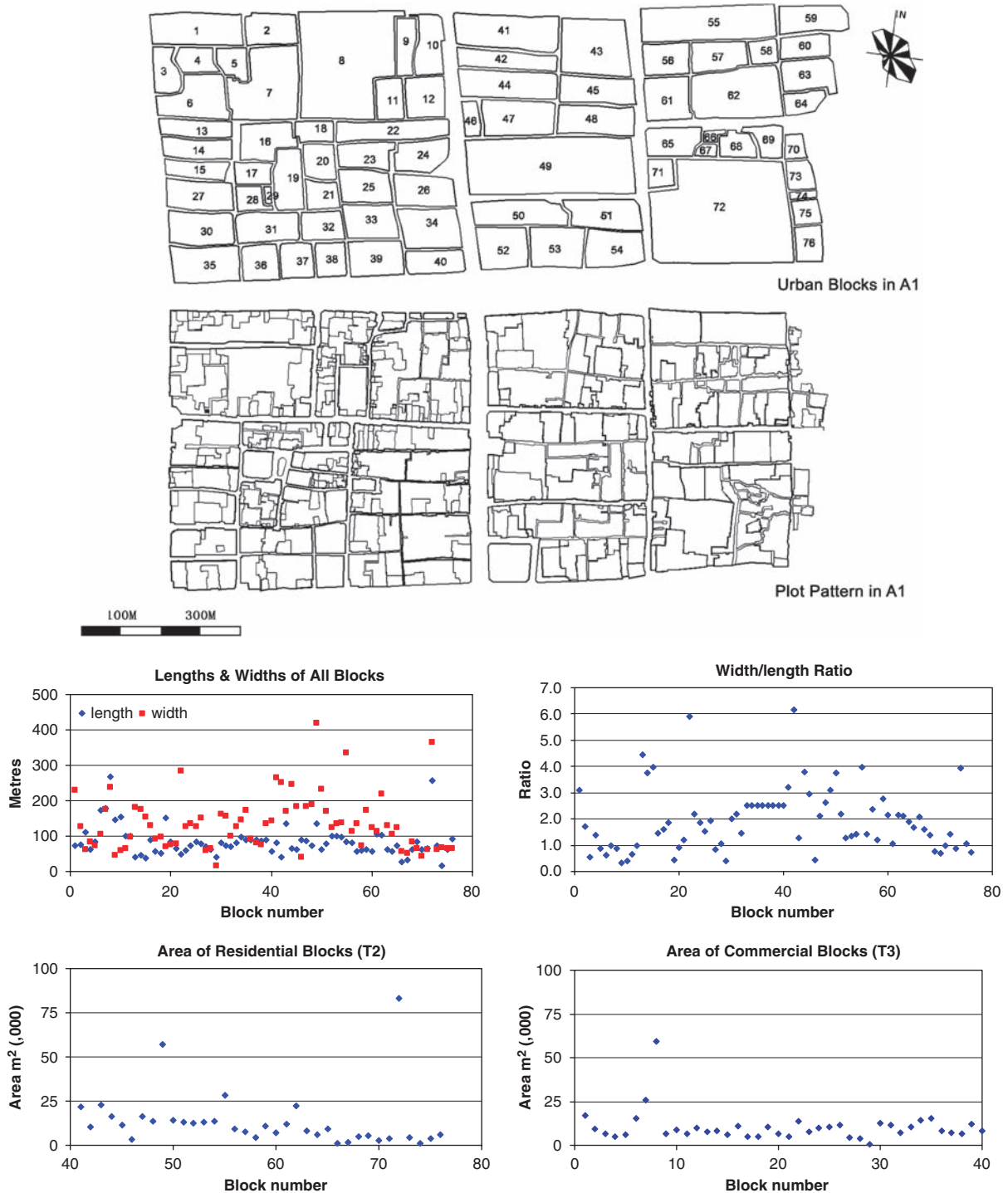


Figure 2: Analysis of A1 indicating the sizes, portions and areas of the blocks (produced by the author).



be shown later. Furthermore, the areas of T3 blocks are smaller than of T2, because most of T3 blocks are for commercial use, whereas the T2 blocks are for residential use, and commercial blocks need more perimeter edges to directly face streets. Another feature observed from these blocks is that the major width/length ratios range from 1 to 2, with few of them exceeding 4. All blocks were arranged in a regular chessboard pattern.

The plots' patterns in T2 blocks differ from that of T3 blocks. In T2 blocks, a plot often occupied a narrow and long slot from the north edge to the south edge of its block. There are exceptions though; for instance, Block 72 has a large centrally located plot, because the rest of the block was undeveloped in this period. Blocks 59, 60, 63 and 64 and Block 70 and 73–76, which are near the east moat of the city, were also not fully developed in this period. In T3 blocks, plots are located along perimeters, which are smaller and much denser than plots in T2 blocks, especially in Block 1–22.

In order to identify the plot patterns and building-grouping patterns of T1, T2 and T3 in more detail, several examples of urban blocks have been selected from both A1 and A2 areas. Their accessibility analysis illustrates the relationship between buildings and the surrounding areas during the period. The Inner City was a typical special block (T1), which accommodated the prefecture governmental buildings before the fourteenth century and was abandoned after that (Figure 3). It was analogous to the whole city with rectangular walls and moats. Major buildings were arranged along a north-south-oriented axis. Their forms were largely similar, apart from some peculiarities on their roofs and minor ornamentations that illustrates social status. These buildings formed large courtyards and defined ritual sequences through the block. Additionally, there were some military buildings along the secondary axis to the west of the main one. The walls and moats of this block defined its boundaries, from which buildings had certain distances, as shown in the small special block to the southwest of the Inner City in Figure 3. Buildings in these blocks were symmetrical along the axes, with access routes from the south streets, many with symbolic gates (PaiFang), indicating the division of LiFangs.

Four blocks in A2 represent the characteristics of the building-grouping pattern of T2 blocks. Due to the lack of historical resources, the detailed map of these four blocks dates only back to 1988 (Figure 4). In this map, the historical buildings built in the first period are marked in black,

whereas buildings built in the following two periods are marked in blue and light grey, which are excluded in the discussion on the plot pattern and building-grouping pattern in the first period. A house complex included several axes, along each of which were 3–5 roofed buildings with 2–4 courtyards. These were between 70 and 100 meters in length, and around 20 meters in width (Figure 5). These houses were north-south-oriented, and arranged in rows adjacent to each other in an east-west direction. This arrangement determined that the lengths of T2 urban blocks were very similar in this period, as observed in Figure 2. Courtyards in each house were small and U-shaped. The accessibility analysis in Figure 4 illustrated that almost all the traditional houses had direct access from the south and north streets. This situation changed in later developments in these sample blocks due to changes in building types.

Suzhou's urban blocks in the second stage of urban development (1850s–1948)

The city gradually recovered from the Opium War and civil wars in the late Qing Dynasty and the early twentieth century. The Republic government launched the 'Proposal of Suzhou Planning' (Suzhou Gong Wu Ji Hua She Xiang) in 1927 in order to develop and modernise the city. The proposal influenced the urban forms of Suzhou, even though only part of it had been fulfilled because of interruptions caused by World War II and the Chinese Civil War (Chen, 2006, p. 98).

Generally, compared to the previous urban blocks, specific changes to the urban blocks in this period can be observed (Figure 6). First, some blocks were formed near the northern city gates as consequence of the construction of the modern railway station to the north of the city. These blocks were of a similar size and pattern as other blocks along the main streets. Second, some T1 blocks were subdivided to contain a number of plots after original historical buildings had been destroyed. Third, urban blocks in study area B were largely shaped during this period, even though their development was not fully complete.

Similar to the analysis of study area A1, blocks in the representative morphological region B are marked by numbers from 1 to 27 (Figure 7). They were not specifically for residential use or commercial use, and did not strictly follow the chessboard pattern, but rather an elusive irregular

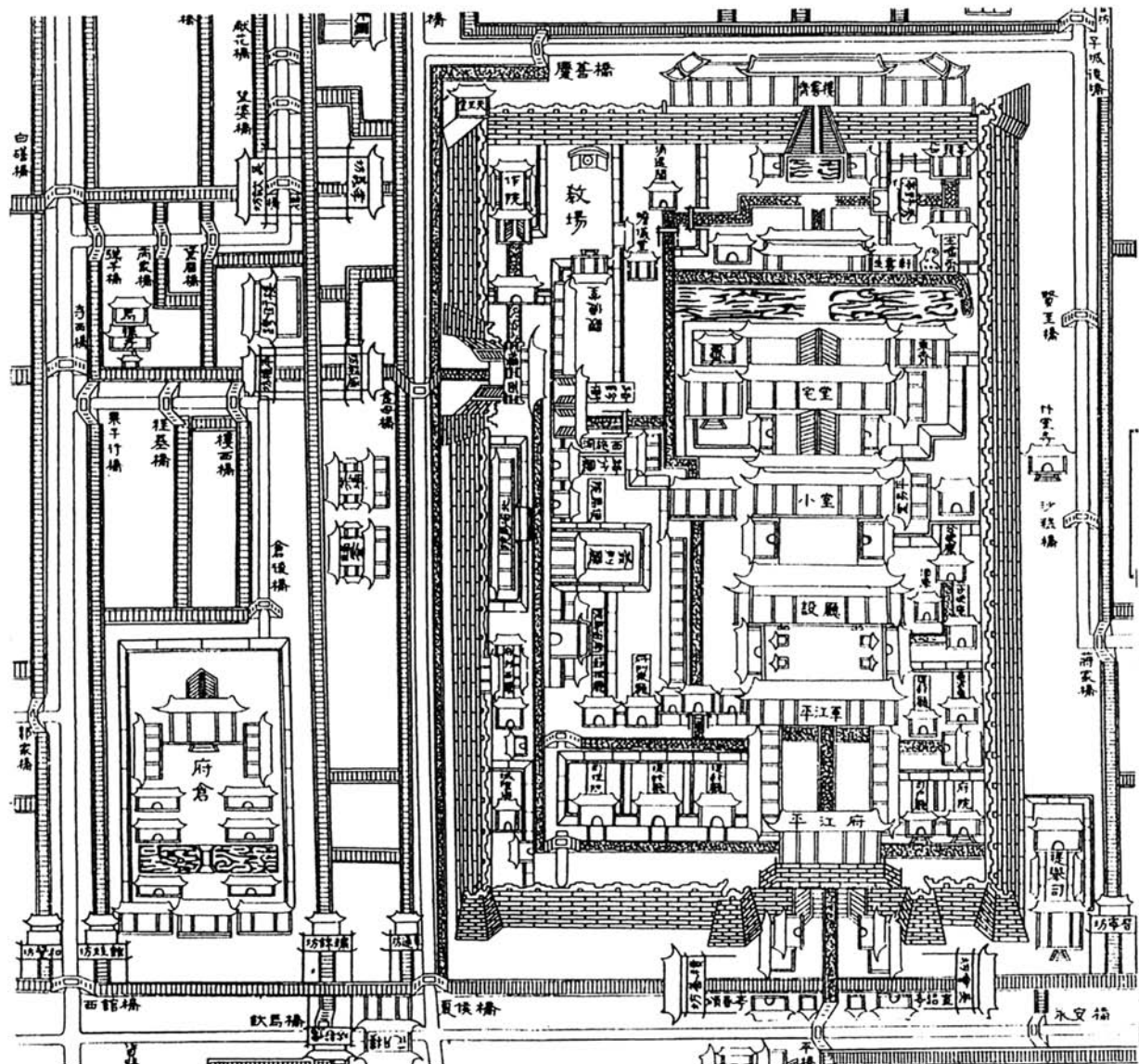


Figure 3: Inner city area and several surrounding T1 blocks (adapted from the Ping Jiang Map (1229) (Wu, 2003, p. 94)).

matrix. Block 25, 26 and 27 were not completely built up at this stage. It can be seen from the four charts that both the lengths and widths of the majority of blocks do not exceed 200 meters, and there is no apparent difference between length and width. The areas of blocks are of a wider range than those of the blocks in A1 of the first period, ranging from 10 000 to 50 000 square meters. Furthermore, the width/length ratios of these blocks are diverse.

The plot pattern was extremely irregular in this period. Plots near the edges of blocks were much smaller than those in the centre, the latter of which were not fully built at this stage. Blocks

13–17 are further selected to illustrate the plot pattern, the accessibility and the building-grouping pattern in detail. Buildings formed in this period are marked in black (Figure 8). Plots in block 13 are comparatively regular, whereas plots in the remaining blocks occupy one outer corner of each block in order to create access from the streets. The building type of this stage was the semi-detached house type. Two of them maintained the same shape and dimension as the traditional roofed buildings without courtyards, which were built of bricks and timber. A house of this type was similar in size to a single building in a traditional courtyard house complex. Houses of

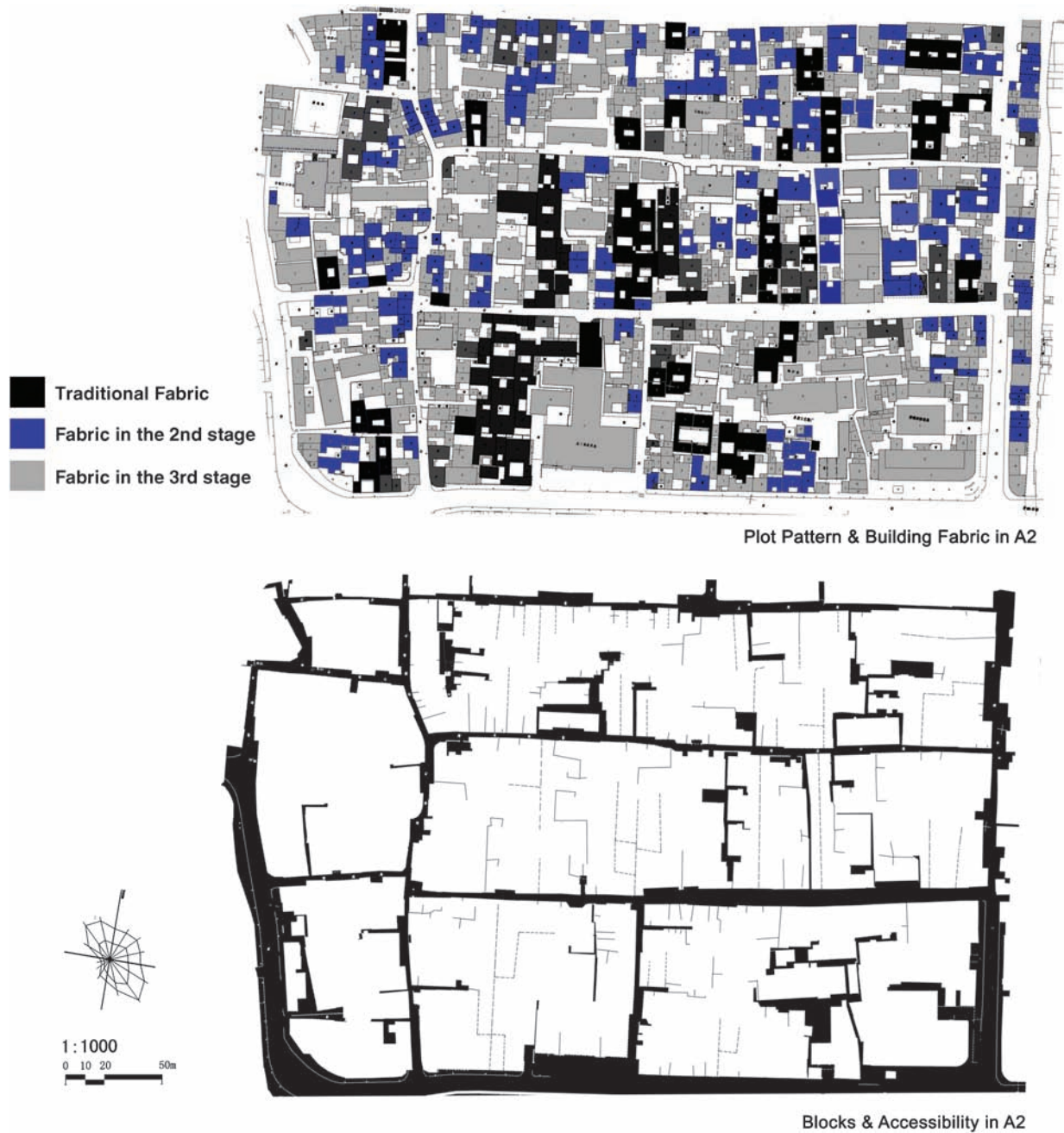


Figure 4: Plot patterns, building fabric and accessibility analysis of blocks in A2 (produced by the author).

this type were also north-south-oriented, two stories high and with pitch roofs, and sat harmoniously with the surrounding urban tissue, even though the composition and fenestration of their elevation were completely altered (Figure 9). In each plot, a cluster of semi-detached houses was connected by a hierarchical circulation system: the plot boundary streets, main alleys and cul-de-sacs to each house.

The emergence of the new building type, which slightly altered the previous plot and block types, was attributed to the social and economic changes of this period. Household sizes decreased and population within the city dramatically increased. Traditional houses were too spacious to be economical. Moreover, western architectural concepts had been adopted in design since this period, affecting traditional building layouts,

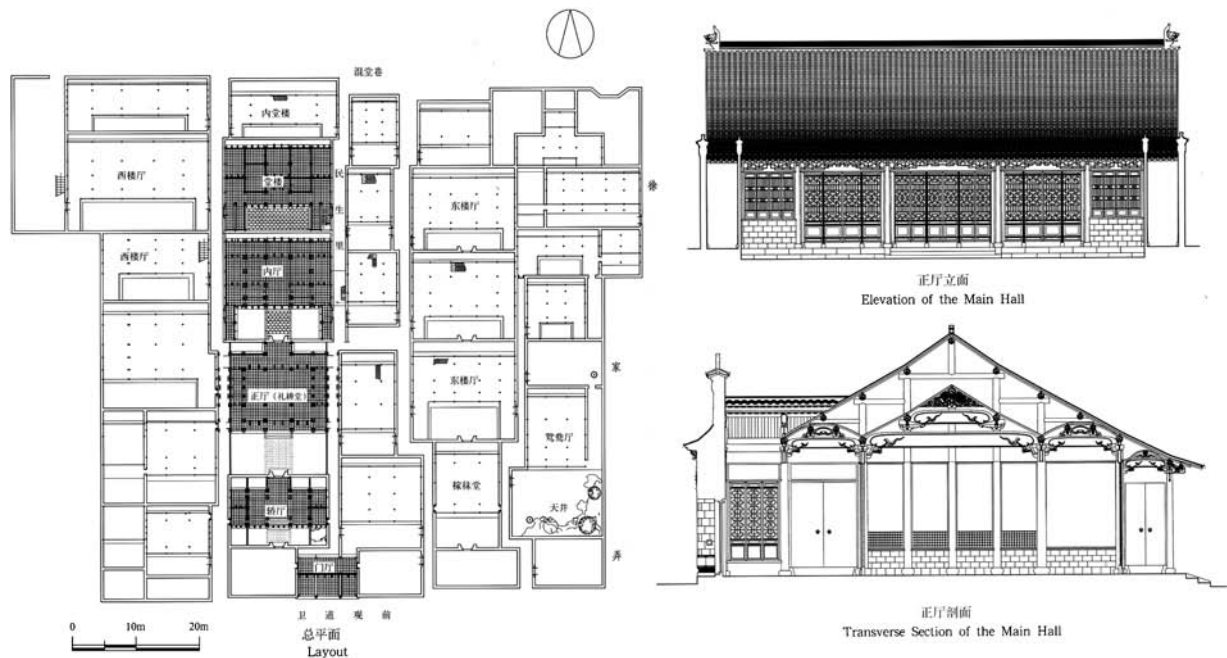


Figure 5: The plan layout, elevation and section of a traditional house complex in the city (The Real Estate Management Bureau of Suzhou, 2004, p. 218–219).

materials and appearances. The semi-detached house type in Suzhou was a combination of the western apartment type and the Chinese traditional courtyard house type.

Suzhou's urban blocks in the third period of urban development (1949–present)

Three stages of development characterise the third period, starting from the foundation of the People's Republic of China (1949) to the Economic Reform (1978), and thereafter. In the first stage, the development of the city was stagnant because of several unrealistic social and political campaigns such as the Cultural Revolution. Meanwhile, radical industrialisation greatly influenced urban forms; for instance, many of the canals were refilled for hygiene; houses were converted into factories; and newly built factories altered the original building fabric. As a result, the plot pattern in many of the urban blocks changed following the transformation of building fabric. Like other Chinese cities, Suzhou entered an era of rapid urbanisation and globalisation in 1978. The city has been expanding towards the western and eastern suburbs, where a new chessboard network has been formed. Moreover, the government has emphasised preservation and regenera-

tion of the old city area since 1986, when the first conservation planning of Suzhou-Suzhou-Shi Cheng Shi Zong Ti Gui Hua, 1986–2000 was launched (Dai, 2004; Shen, 2005; Yu, 2006). The general urban form has been changing and adjusting to new needs throughout this period.

The current physical configurations of urban blocks and plots of Suzhou are shown in Figure 10. Compared to the previous situations, the built-up area was expanded into the entire old city. The block patterns in the middle part have been preserved, and individual blocks are much smaller than new blocks in the southern part of the city, as are the plots. Some previously uncompleted urban blocks have been occupied by urban parks, residential quarters or the public sector, for instance Blocks 7, 8 and 9 in B became a public park; and Block 27 in B has become occupied by the University of Suzhou. Therefore, these blocks remained as super blocks and have brought transport pressures to their surrounding areas.

Area of C is the representative morphological region to show the characteristics of urban blocks and plots of Suzhou at this stage. In a larger area than A1 and B, C contains only four blocks. The dimensions are shown in the table, and are much greater than the previous blocks (Figure 11). The smallest block is about 24 000 square meters, whereas the largest block is 62 600 square meters.

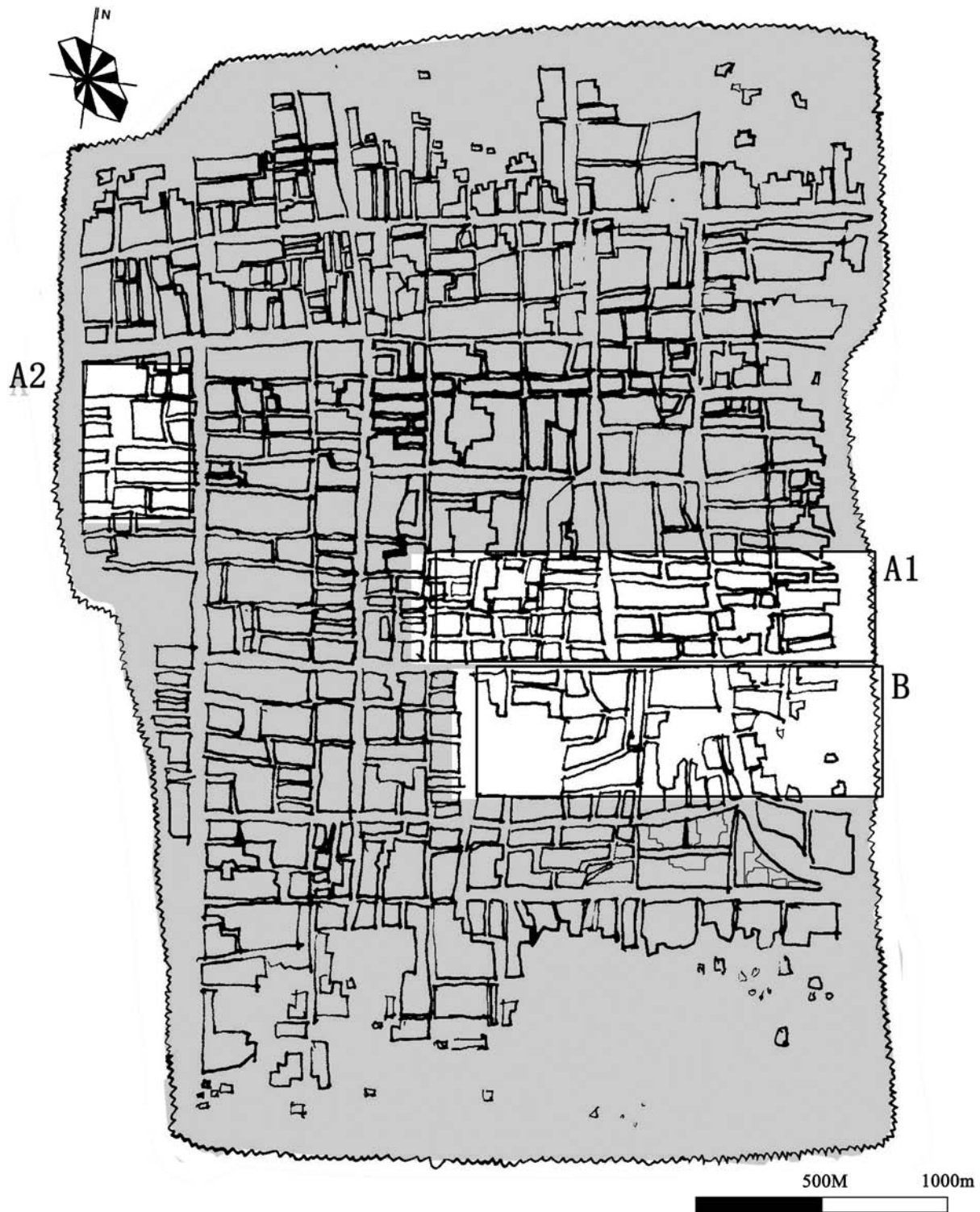


Figure 6: Urban blocks of Suzhou in the second period and the selected study areas A1, A2 and B (produced by the author according to the city map in 1949).

The width/length ratios are about 1 to 2.5. The plot pattern in these four blocks is irregular. Plots near the main street are small, and large inside

each block, as well as near the east and south city walls. There are several super plots in each block. The access routes are comparatively

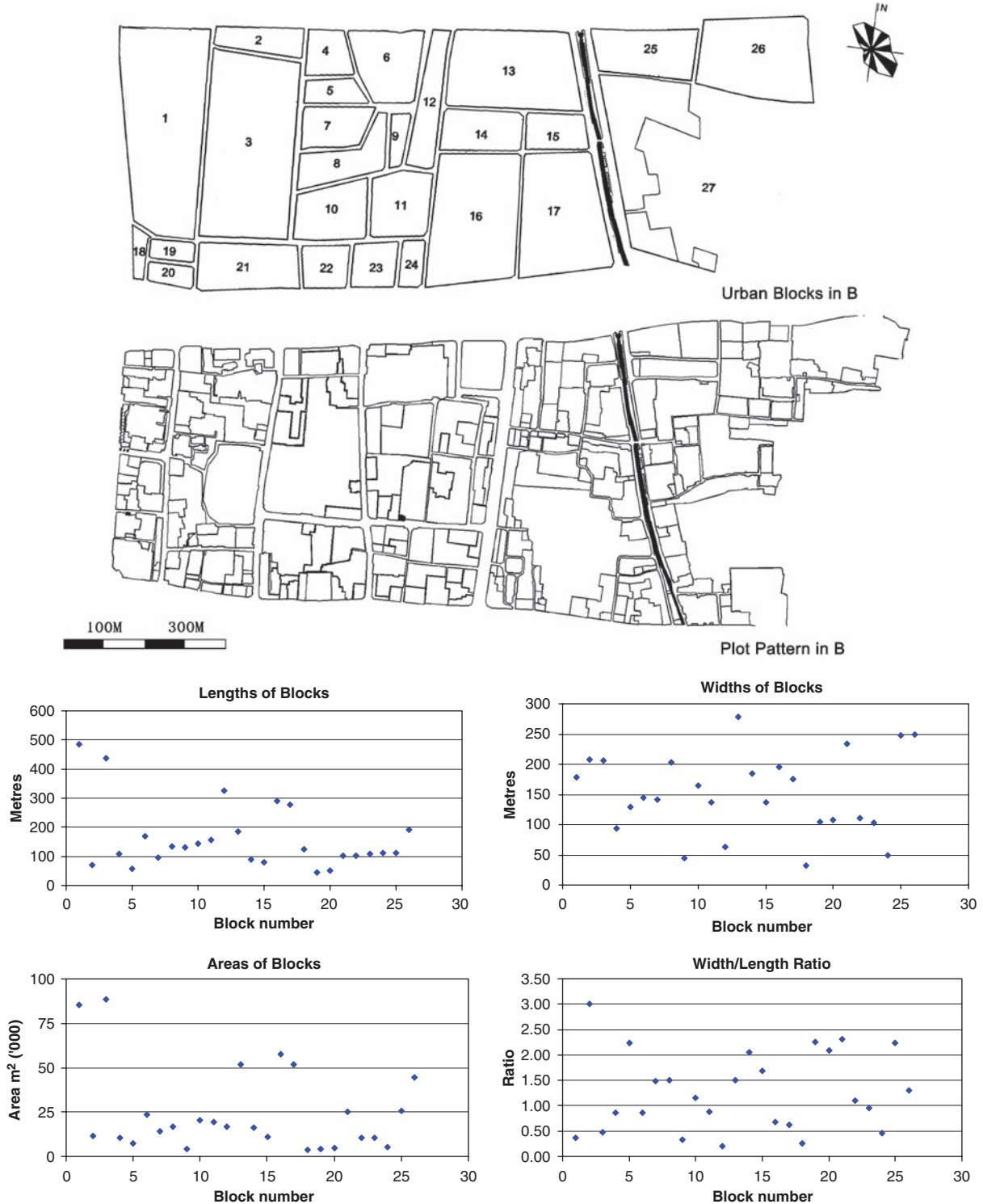


Figure 7: Analysis of blocks in B including the sizes, proportions and areas of the blocks (produced by the author).

wide, geometrically straight and have circular vehicle buffers.

Take Block 1 in this area as an example to interpret the plot pattern and building cluster in

detail (Figure 12). There are clearly three plot patterns coinciding with three types of plot pattern in Block 1 separated by the canal, which are located on the northwest, the northeast and



Figure 8: Plot patterns, building fabrics and accessibility analysis of Blocks 13–17 in B (adapted by the author according to the map produced by the Suzhou Institute of urban design and Planning (Suzhou shi gui hua she ji yan jiu yuan) (1998) from Shi (2001, p. 38)).

the south of the canal. In the northwest area, the first type of plot pattern is generated by some modern detached houses and vast administrative buildings with two front squares. The second type of plot pattern in the northeast area is formed by hotels and office buildings, each of which is free-standing and surrounded by green land and wide roads. A central circular point at the entrance radiates several secondary roads throughout the area from the main street of the city to the north. In the middle and south of the area, the residential quarter presents the third type, which consists of identical bar buildings similar in length but different in widths. Buildings are north-south-oriented, six stories high and laid out in rows and columns. The inner street system is geometric, and forms a 'tree' pattern from the major street of the city into each cell of the buildings. The southwest corner is occupied by a hospital and some commercial buildings.

They are also in bar shape, but are larger than the residential buildings. Similarly, they are arranged in rows.

The third type of the geometric 'trees' arrangement is the major type in the area, as shown in the accessibility analysis in Figure 12. The large-scale housing development arranged according to this type is driven by profit, and adapts to the demographical changes and shortage of urban land. The modern forms in limited types are copied and mass-produced nation-wide, regardless of local culture, topography and climate. They largely disrupt existing urban fabrics. The identical appearance of buildings and singularity of arrangement create monotonous city images. Furthermore, standard plans in residential developments have limited spatial flexibility, which causes environmental damage and resource waste due to the second-time renovation of each apartment by consumers after purchase. Buildings in



Figure 9: A mixture of traditional houses and semi-detached houses of Suzhou during the 1940s and 1950s (Architectural Department of Tongji University, 1958).

the other two types of grouping patterns are also international-style contemporary buildings without a relation to the traditional fabric.

In this period, many design attempts of modern courtyard houses have been conducted to replace the dilapidated traditional courtyard houses, and fit into the largely existing traditional fabric. However, they were not very successful, because a design of those houses not only fell victim to superficial image-imitation of traditional house due to the lack of awareness of traditional types of blocks and plots, but also led to social gentrification in certain areas. Thus, a more effective design approach is required to connect the new and the old in the future design of the city. One should concern not only the 'appearance' of a new design, but also its spatial structure at multiple scales, as well as the existing social relationships in the site.

Urban Design Suggestions

Recently, the municipal government has been trying to protect the identity of the city through a number of design policies and conservation

regulations, for instance the height restriction in new developments in the old city area, which limits buildings within six stories and 24 meters; several traditional public buildings and large private traditional houses are listed for conservation (Government, 2003). However, the identity of the city not only relies on the conservation of the old, but also on new future design.

Synchronic types of urban blocks, plots and building arrangements in each stage of the development of the city have been outlined (Table 1). Some of the typological processes can be clearly recognised from the similarity and changes between these synchronic types (Table 2). The typological processes indicate that a series of types can survive dramatic changes brought about by political, economic and cultural forces. The typological transformation of block types is very slow, whereas the transformation of plot types is faster in Suzhou. Plots in the T2 blocks from the first stage were split up in length and maintained their widths in the second stage. Shapes of the plots were more or less rectangular, and plots were arranged in a manner as orderly as those of the first stage because the semi-detached

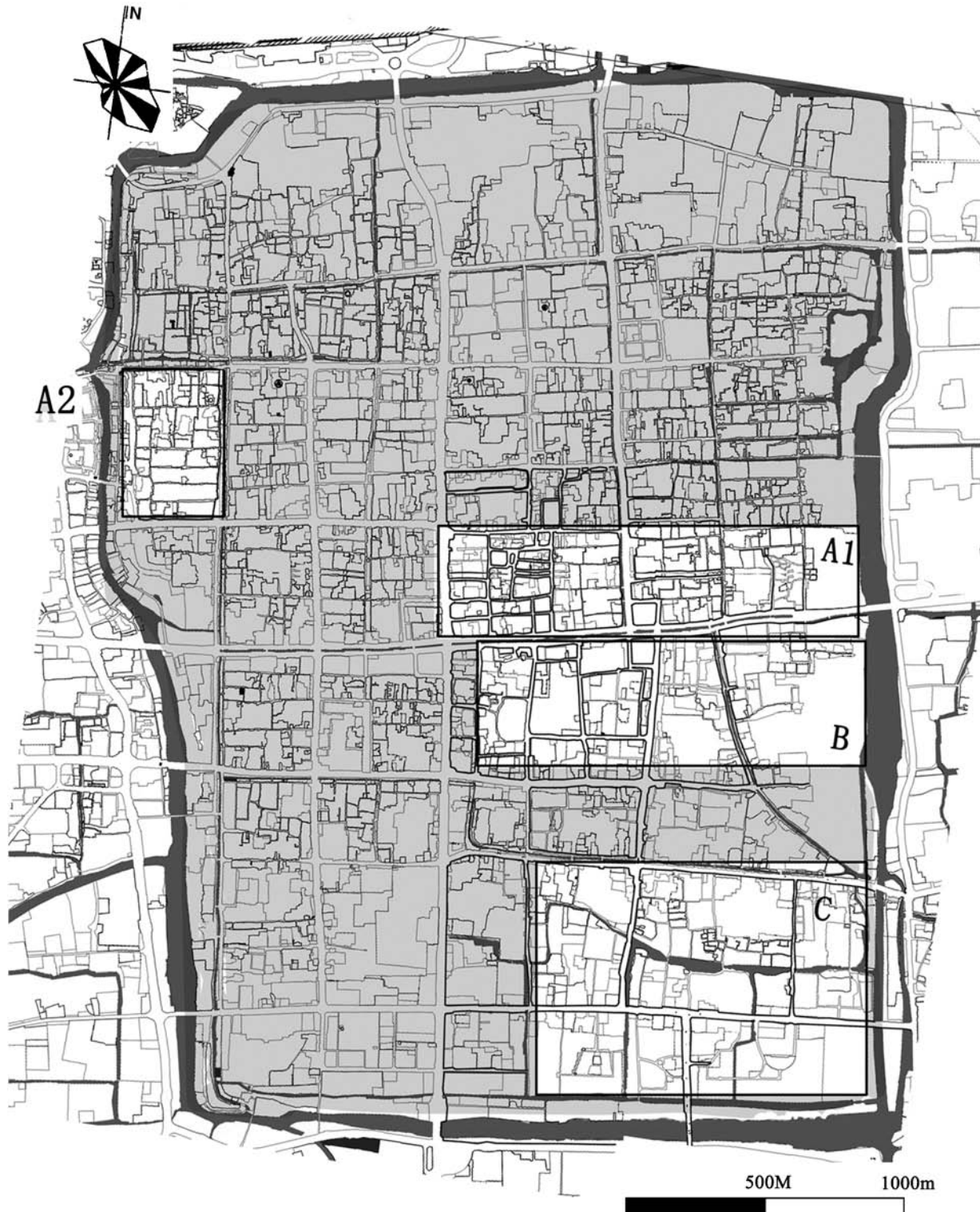


Figure 10: Urban blocks and plots of Suzhou in the third period (adapted by the author according to the latest city map 2007).

building type of the second stage was related to the courtyard house type of the first stage. In T3 blocks, plots arranged along the perimeters were

smaller than the plots in the centre in order to allow buildings to be accessible directly from the streets. The typological process of building types

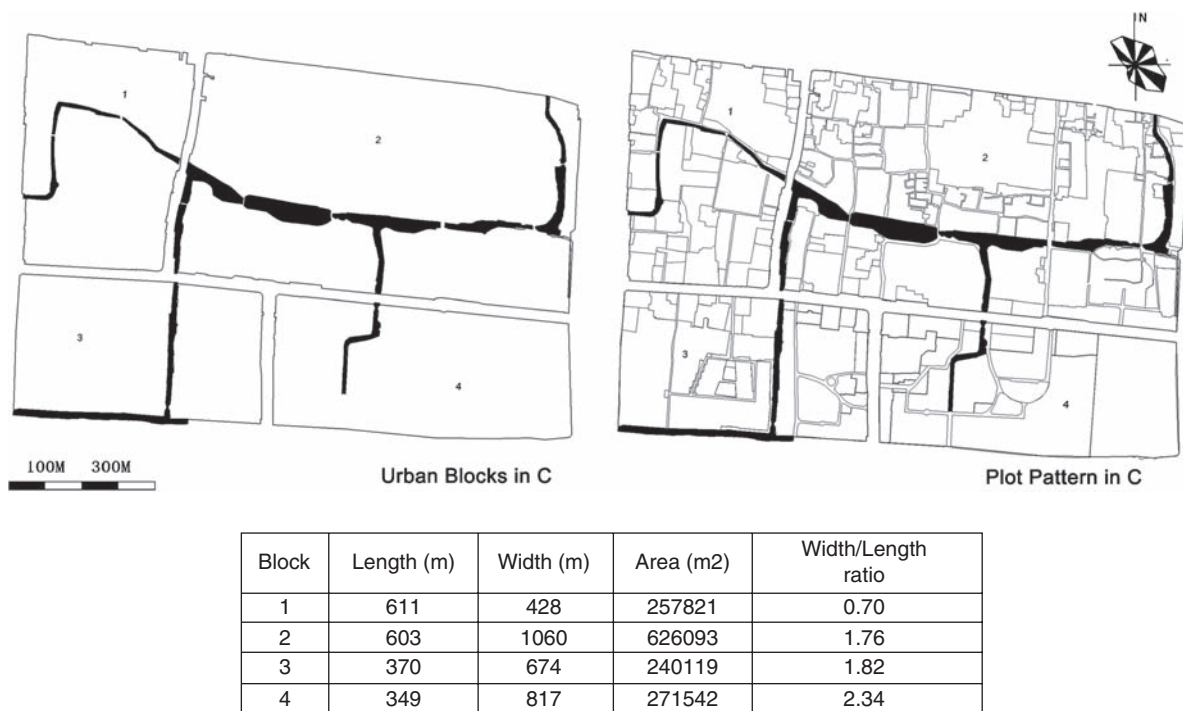


Figure 11: Analysis of blocks in C including the sizes, proportions and areas of the blocks (produced by the author).

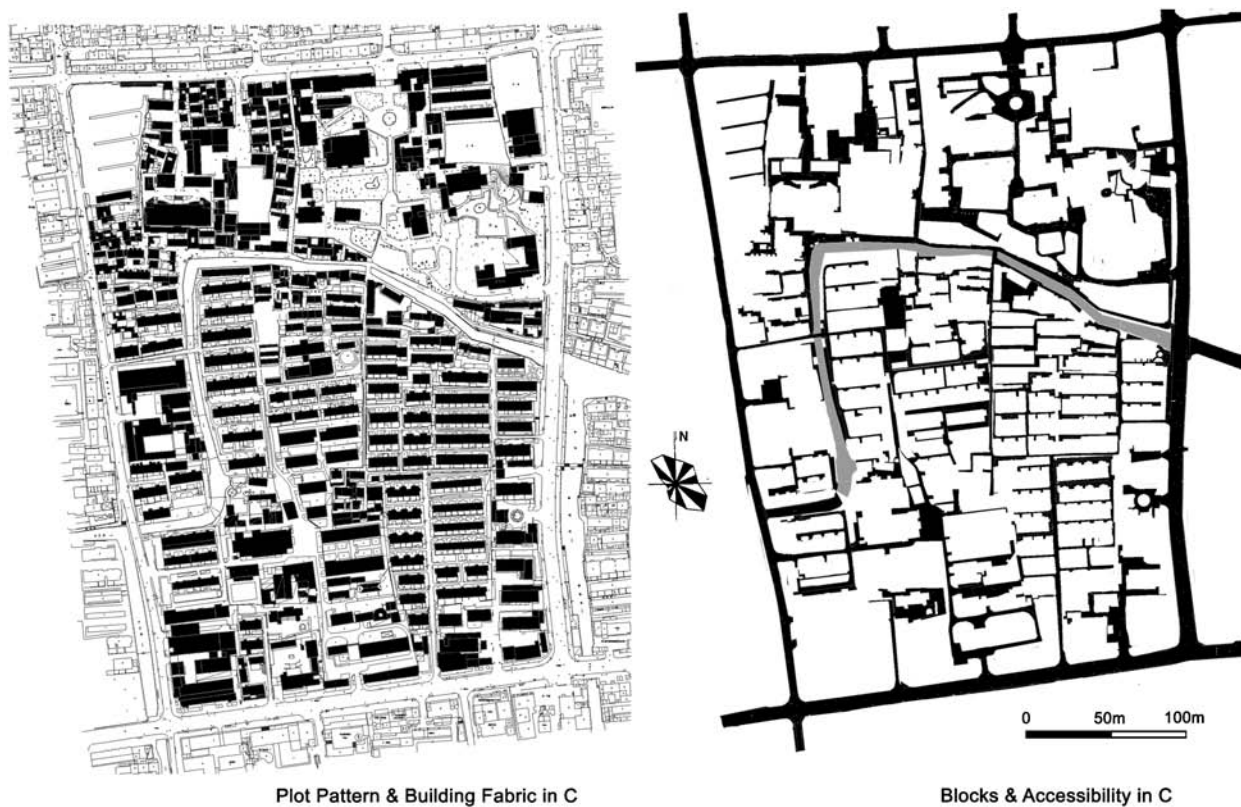

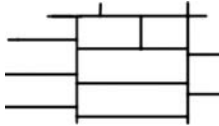
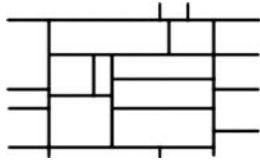


Figure 12: Plot patterns, building fabrics and accessibility analysis of Block 1 in C (produced by the author according to the current map from the Jiangsu Institute of Urban Planning and Design).

**Table 1:** Characteristics and diagrams of the three block types in Suzhou (produced by the author)

	<i>Block types</i>		
	<i>Type 1</i>	<i>Type 2</i>	<i>Type 3</i>
<i>Block types</i>			
Characters	1. Size depends on the grand building complex. 2. Symmetrical. 3. A building complex is in the centre, walled.	1. Lengths are between 70 and 100 meters; widths are various; width/length ratios are 1 to 3. 2. Rectangular shape. 3. Orderly arranged.	1. Lengths are between 70 and 100 meters; widths are various; width/length ratios are various. 2. Shapes are various. 3. Arranged in gridiron, less orderly.
Diagram			

only continued in the first two periods. Therefore, all the synchronic types in the first stage and their typological processes in the first two stages are useful for the city's identity and future designs.

Traditional urban forms are worth preserving and re-employing for the following three reasons. Psychologically, traditional urban forms are imprinted into the collective memory and become symbols of a culture. Functionally, they have been playing an indispensable role in the inhabitants' daily lives. For example, the physical form of traditional houses facilitates a high frequency of social interaction between dwellers; the courtyards are ideal communal places for public dining gathering, doing housework and children's play. The streets and alleys in the neighbourhood have human scales and are away from automobiles so that they are pleasant spaces for informal chatting and activity. Ecologically, they are the most robust choices in the local climate conditions; for example courtyards are essential for sunlight prevention and ventilation in the summer.




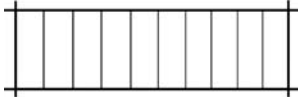
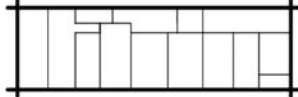
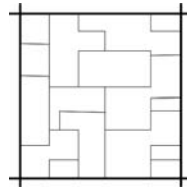
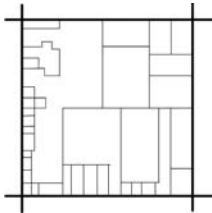
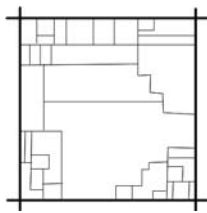
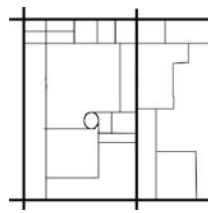
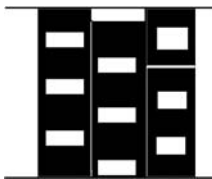
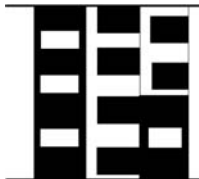
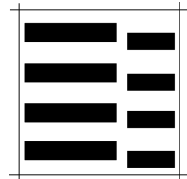
Designers should follow these traditional types by using existing or previous traditional streets, lanes or alleys. In this case, pure pedestrianisation is likely to be insisted upon inside traditional blocks of the old city, while vehicles should be kept on the main streets near the block borders. Currently, private car ownership is not prevalent among residents of the old city (Cao and Cui, 2002), and it should be discouraged by both urban policies and urban design. The public transportation system should be highly developed as the alternative. New buildings should maintain the lines of traditional plots and blocks, which need

support from the land lease policy of the government. A common block should be between 70 and 100 meters deep and 300 meters wide. A common plot should be 70 meters deep and around 20 meters wide allowing a pair of buildings to attach to each other through a common wall. Building fabric should have clear north-south orientation.

As the blocks and plot types are determined by buildings, building types are important. Apart from necessary conservation, some traditional courtyard houses can be adapted to different needs required of the present time. It is unlikely that a single family would occupy the entire complex as before, because the population of the city has increased rapidly and house ownership has changed to collective ownership in the third period. As the structure and space utilisation are separated in the traditional house complex, it is possible for individual buildings to be subdivided into small modern apartments for small families, and the courtyards to be kept free for public uses.

Furthermore, where traditional houses do not exist, new houses should be one or two stories high, 20 meters wide and north-south-oriented, with southern main entrances and grey pitch roofs. Several such houses in one plot should be arranged in a row, and there could be low walls on the east and west edges of two houses to define the publicly accessible courtyards. Housing density and capacity can be maintained the same as before by following the traditional plot patterns. Moreover, even though the modern apartment house types are inevitable alternatives, modern buildings located in the old city should be incorporated with elements of the traditional

Table 2: Diagrams of the typological processes of urban blocks, plots and building arrangements

<i>Typological processes of urban blocks, plots and building fabrics</i>			
	<i>The first period</i>	<i>The second period</i>	<i>The third period</i>
T1, T2, T3 blocks	Refers to Table 1	Remain the same	T1, T2 remain the same; T3 changed
Plot type in T1			
Plot type in T2			
Plot type in T3			
Building arrangement type in T1	Buildings form a sequence of courtyards along a north-south oriented axis or several axes; symmetrical.	Some remained as conservation sites; some were demolished.	Some remained as conservation sites; some were demolished.
Building arrangement type in T2			
Building arrangement type in T3	The same structure as the traditional single building; not strictly north-south oriented.	Modern building composition.	Modern building composition.

'|' indicates the continuity of the typological process; '||' indicates the discontinuity of the typological process (produced by the author).

courtyard house type and the semi-detached house type by employing the features of roof and eave, and following the traditional plot and block types.

Buildings with other functions should have a similar volume to the historical roofed buildings, for instance the same width, depth and height. They should be arranged along the perimeters of blocks and attached to each other. A particular modern function such as education and exhibition should be dispersed in a group of small buildings

where possible. The necessary mega-structures such as stadiums, theatres and airports should be kept at a distance from the areas with identifiable traditional fabrics.

Discussion and Conclusion

There are some limitations in the case study analysis due to the lack of available historical



maps. The outlines of blocks in this study were retraced according to street or canal lines. Thus, whether certain urban blocks have been completed or not during that time is uncertain. Furthermore, detailed plot patterns and building fabrics were absent in historical maps; therefore, 'representatives' from the contemporary maps have been employed to illustrate the characteristics of the plots and building fabrics during the first two periods. Even though they have been largely shaped throughout history, and preserved well compared to their counterparts, the study is not accurate. The resource limitation means that the urban form analysis of Suzhou needs more substantial field surveys and archaeological investigation.

The urban blocks, plots and building forms in Suzhou do not embody all the traditional characteristics of the city, which are also embodied in other urban elements. Typomorphological studies should also be conducted for the street system, streets, urban public spaces, public buildings and private houses in detail in order to gain all the Chinese traditional types for design reference. This also indicates the direction of future research.

Urban design is a complex process that covers various aspects of the urban environment. The design suggestions mentioned above focus only on the cultural identity aspect of the urban form, which is currently one of the most important aspects for Chinese cities. There are many other issues in the design process that designers should consider, for instance technical, functional, environmental aspects and so forth. All such design issues are essential for generating quality urban spaces. Furthermore, the criteria of good urban space in a general sense should also be taken into account in the Chinese context, such as vitality, diversity, accessibility, authenticity, high density, legibility, adaptability and coherence (see, for example, Lynch, 1981; Bentley *et al*, 1985; Jacobs and Appleyard, 1987). These criteria have not been discussed in detail in this paper.

The identity of Chinese cities based upon their traditions is urgently required to be incorporated with productions of urban forms in the contemporary period. The urban form study of Suzhou revealed two advantages of typomorphological approach in the Chinese context. First, the typomorphological approach for urban forms is able to reveal and summarise the characteristics of urban elements through different periods of development by types. Second, types and

typological processes that are deeply rooted in the local culture and people's spontaneous consciousness make the application of the traditional characteristics to new design possible. They provide references for designers and domestic policy-makers and allow designers' inspiration and creativity at the same time. Therefore, new forms are not identical to traditional forms, but are harmonious with the historical context and evoke local people's sense of place. The typomorphological approach can be a solution to the identity crisis of contemporary Chinese cities.

The design suggestions cannot be generalised to other Chinese cities, especially on urban elements at large scales, as the natural environment, social, political and cultural conditions can differ greatly throughout China, even though there may be some similarities between building types in different cities of the same region. These would require further investigation. The methodology implied in typomorphology and developed in this study can be used to analyse other Chinese cities and generate relative design guidelines for other contexts.

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